ANDREI T. SAVICI

email	saviciat@ornl.gov
phone	(917)543-5535
github	https://github.com/AndreiSavici
orcid	https://orcid.org/0000-0001-5127-8967

GOAL

Advance neutron scattering techniques through new mathematical approaches and better software

EXPERTISE

Neutron scattering - direct geometry spectroscopy, triple axis spectroscopy, single crystal diffraction, event based data processing

Scientific computing - C++, Python, IDL

Muon spin relaxation

EXPERIENCE

2013–present **Software Scientist**

NScD, Oak Ridge National Laboratory

Develop capabilities for direct geometry spectroscopy, in particular for polarized neutron scattering. Developed the mathematics and implemented algorithms that allow data processing and visualization for large regions in reciprocal space, with application to direct geometry spectroscopy and single crystal diffuse scattering. Implemented autoreduction at many instruments.

2010–2013 **Postdoctoral Researcher - software**

NScD, Oak Ridge National Laboratory/ORAU

Worked on software for direct geometry neutron spectroscopy. Developed the NXSPE file format, and increased speed and usability for the DAVE software when using data from SNS instruments. Started developing data reduction routines in MANTID.

2007–2009 **Postdoctoral Researcher - neutron scattering**

Johns Hopkins University

Worked on the design of a high magnetic field instrument (ZEEMANS). Research related to low dimensional magnetic systems (1D), using inelastic neutron scattering.

2004–2007 **Postdoctoral Researcher - neutron scattering**

Brookhaven National Laboratory

Learned neutron scattering, with focus on Triple Axis Spectroscopy. Research related to low dimensional magnetic systems (2D), using inelastic neutron scattering.

1999–2004 **Graduate Research Assistant**

Columbia University

Research related to superconductors and low dimensional magnetic systems, using muon spin relaxation.

1998–2004 **Teaching Assistant**

Columbia University

Taught introductory and advanced laboratories, held recitation sections for lectures ranging from introductory undergraduate physics to graduate condensed matter.

EDUCATION

2000-2004 Columbia University

Ph.D. Physics Dissertation: *Muon Spin Relaxation Study of Coexisting Superconductivity and Magnetic Ordering in La_2CuO_4 Based Systems Advisor:* Prof. Y.J.Uemura

1998-2000 Columbia University

M.Phil. Physics Graduate School of Arts and Science

1997-1998 Babes-Bolyai University

M.S. Physics Department of Physics

1993-1997 Babes-Bolyai University

B.S. Physics Department of Physics

ADDITIONAL INFORMATION

Invited talks

2007 · Oak Ridge National Laboratory User Week - Spin structure and excitations emerging in hole-doped layered perovskite $La_{1.5}Sr_{0.5}CoO_4$

2009 · American Crystallographic Association Conference, Toronto, Canada - Searching for stripes in short range charge and spin superstructures

2016 · Johns Hopkins Condensed Matter Seminar - Data treatment and measurement statistics for time-of-flight neutron scattering experiments

2018 · Superstripes / Quantum Complex Matter Conference, Rome, Italy - Neutron scattering data challenges and opportunities for quantum condensed matter

PUBLICATIONS

[1] Y. Li, N. Zaki, V. O. Garlea, A. T. Savici, D. Fobes, Z. Xu, F. Camino, C. Petrovic, G. Gu, P. D. Johnson, J. M. Tranquada, and I. A. Zaliznyak. "Electronic properties of the bulk and surface states of Fe1+yTe1xSex". In: *Nature Materials* (2021). DOI: 10.1038/s41563-021-00984-7.

[2] J. P. Mahalik, W. Li, A. T. Savici, S. Hahn, H. Lauter, H. Ambaye, B. G. Sumpter, V. Lauter, and R. Kumar. "Dispersity-Driven Stabilization of Coexisting Morphologies in Asymmetric Diblock Copolymer Thin Films". In: *Macromolecules* 54 (2021), pp. 450–459. DOI: 10.1021/acs.macromol.0c01722.

[3] A. Sapkota, L. Classen, M. B. Stone, A. T. Savici, V. O. Garlea, A. Wang, J. M. Tranquada, C. Petrovic, and I. A. Zaliznyak. "Signatures of coupling between spin waves and Dirac fermions in $YbMnBi_2$". In: *PHYSICAL REVIEW B* 101 (2020), p. 041111. DOI: 10.1103/PhysRevB.101.041111.

[4] D. M. Pajerowski, K. M. Taddei, L. D. Sanjeewa, A. T. Savici, M. B. Stone, and J. W. Kolis. "Quantification of local Ising magnetism in rare-earth pyrogermanates $Er_2Ge_2O_7$ and $Yb_2Ge_2O_7$". In: *PHYSICAL REVIEW B* 101 (2020), p. 014420. DOI: 10.1103/PhysRevB.101.014420.

[5] M. G. Kim, B. Winn, S. Chi, A. T. Savici, J. A. Rodriguez-Rivera, W. C. Chen, X. Xu, Y. Li, J. W. Kim, S.-W. Cheong, and V. Kiryukhin. "Spin-liquid-like state in pure and Mn-doped $TbInO_3$ with a nearly triangular lattice". In: *PHYSICAL REVIEW B* 100 (2019), p. 024405. DOI: 10.1103/PhysRevB.100.024405.

[6] L. S. Wu, S. E. Nikitin, M. Brando, L. Vasylechko, G. Ehlers, M. Frontzek, A. T. Savici, G. Sala, A. D. Christianson, M. D. Lumsden, and A. Podlesnyak. "Antiferromagnetic ordering and dipolar interactions of $YbAlO_3$". In: *PHYSICAL REVIEW B* 99 (2019), p. 195117. DOI: 10.1103/PhysRevB.99.195117.

[7] X. Bai, J. A. M. Paddison, E. Kapit, S. M. Koohpayeh, J.-J. Wen, S. E. Dutton, A. T. Savici, A. I. Kolesnikov, G. E. Granroth, C. L. Broholm, J. T. Chalker, and M. Mourigal. "Magnetic Excitations of the Classical Spin Liquid $MgCr_2O_4$". In: *PHYSICAL REVIEW LETTERS* 122 (2019), p. 097201. DOI: 10.1103/PhysRevLett.122.097201.

[8] J. C. Leiner, H. O. Jeschke, R. Valentí, S. Zhang, A. T. Savici, J. Y. Y. Lin, M. B. Stone, M. D. Lumsden, J. Hong, O. Delaire, W. Bao, and C. L. Broholm. "Frustrated Magnetism in Mott Insulating $(V_{1-x}Cr_x)_2O_3$". In: *PHYSICAL REVIEW X* 9 (2019), p. 011035. DOI: 10.1103/PhysRevX.9.011035.

[9] L. S. Wu, S. E. Nikitin, Z. Wang, W. Zhu, C. D. Batista, A. M. Tsvelik, A. M. Samarakoon, D. A. Tennant, M. Brando, L. Vasylechko, M. Frontzek, A. T. Savici, G. Sala, G. Ehlers, A. D. Christianson, M. D. Lumsden, and A. Podlesnyak. "Tomonaga-Luttinger liquid behavior and spinon confinement in $YbAlO_3$". In: *NATURE COMMUNICATIONS* 10 (2019). DOI: 10.1038/s41467-019-08485-7.

[10] J. Liu, A. T. Savici, G. E. Granroth, K. Habicht, Y. Qiu, J. Hu, Z. Q. Mao, and W. Bao. "A Triplet Resonance in Superconducting $Fe_{1.03}Se_{0.4}Te_{0.6}$". In: *CHINESE PHYSICS LETTERS* 35 (2018). DOI: 10.1088/0256-307X/35/12/127401.

[11] P. F. Peterson, D. Olds, A. T. Savici, and W. Zhou. "Advances in utilizing event based data structures for neutron scattering experiments". In: *REVIEW OF SCIENTIFIC INSTRUMENTS* 89 (2018). DOI: 10.1063/1.5034782.

[12] S. Gao, K. Guratinder, U. Stuhr, J. S. White, M. Mansson, B. Roessli, T. Fennell, V. Tsurkan, A. Loidl, M. C. Hatnean, G. Balakrishnan, S. Raymond, L. Chapon, V. O. Garlea, A. T. Savici, A. Cervellino, A. Bombardi, D. Chernyshov, C. Ruegg, J. T. Haraldsen, and O. Zaharko. "Manifolds of magnetic ordered states and excitations in the almost Heisenberg pyrochlore antiferromagnet $MgCr_2O_4$". In: *PHYSICAL REVIEW B* 97 (2018). DOI: 10.1103/PhysRevB.97.134430.

[13] A. Banerjee, P. Lampen-Kelley, J. Knolle, C. Balz, A. A. Aczel, B. Winn, Y. Liu, D. Pajerowski, J. Yan, C. A. Bridges, A. T. Savici, B. C. Chakoumakos, M. D. Lumsden, D. A. Tennant, R. Moessner, D. G. Mandrus, and S. E. Nagler. "Excitations in the field-induced quantum spin liquid state of α-$RuCl_3$". In: *NPJ QUANTUM MATERIALS* 3 (2018). DOI: 10.1038/s41535-018-0079-2.

[14] L. S. Wu, S. E. Nikitin, M. Frontzek, A. I. Kolesnikov, G. Ehlers, M. D. Lumsden, K. A. Shaykhutdinov, E.-J. Guo, A. T. Savici, Z. Gai, A. S. Sefat, and A. Podlesnyak. "Magnetic ground state of the Ising-like antiferromagnet $DyScO_3$". In: *PHYSICAL REVIEW B* 96 (2017). DOI: 10.1103/PhysRevB.96.144407.

[15] T. M. Michels-Clark, A. T. Savici, V. E. Lynch, X. Wang, M. Chodkiewicz, T. Weber, H.-B. Burgi, and C. M. Hoffmann. "Expanding Lorentz and spectrum corrections to large volumes of reciprocal space for single-crystal time-of-flight neutron diffraction (vol 49, pg 497, 2016)". In: *JOURNAL OF APPLIED CRYSTALLOGRAPHY* 50 (2017), p. 1559. DOI: 10.1107/S1600576717006781.

[16] A. T. Savici, I. A. Zaliznyak, V. O. Garlea, and B. Winn. "Data processing workflow for time of flight polarized neutrons inelastic measurements". In: *INTERNATIONAL CONFERENCE ON POLARISED NEUTRONS FOR CONDENSED MATTER INVESTIGATIONS (PNCMI 2016)*. Vol. 862. Journal of Physics Conference Series. 2017. DOI: 10.1088/1742-6596/862/1/012023.

[17] I. A. Zaliznyak, A. T. Savici, V. O. Garlea, B. Winn, U. Filges, J. Schneeloch, J. M. Tranquada, G. Gu, A. Wang, and C. Petrovic. "Polarized neutron scattering on HYSPEC: the HYbrid SPECtrometer at SNS". In: *INTERNATIONAL CONFERENCE ON POLARISED NEUTRONS FOR CONDENSED MATTER INVESTIGATIONS (PNCMI 2016)*. Vol. 862. Journal of Physics Conference Series. 2017. DOI: 10.1088/1742-6596/862/1/012030.

[18] T. M. Michels-Clark, A. T. Savici, V. E. Lynch, X. Wang, and C. M. Hoffmann. "Expanding Lorentz and spectrum corrections to large volumes of reciprocal space for single-crystal time-of-flight neutron diffraction". In: *JOURNAL OF APPLIED CRYSTALLOGRAPHY* 49 (2016), 497–506. DOI: 10.1107/S1600576716001369.

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[22] I. Zaliznyak, A. T. Savici, M. Lumsden, A. Tsvelik, R. Hu, and C. Petrovic. "Spin-liquid polymorphism in a correlated electron system on the threshold of superconductivity". In: *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA* 112 (2015), 10316–10320. DOI: 10.1073/pnas.1503559112.

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[24] O. Arnold, J. C. Bilheux, J. M. Borreguero, A. Buts, S. I. Campbell, L. Chapon, M. Doucet, N. Draper, R. F. Leal, M. A. Gigg, V. E. Lynch, A. Markvardsen, D. J. Mikkelson, R. L. Mikkelson, R. Miller, K. Palmen, P. Parker, G. Passos, T. G. Perring, P. F. Peterson, S. Ren, M. A. Reuter, A. T. Savici, J. W. Taylor, R. J. Taylor, R. Tolchenoy, W. Zhou, and J. Zikoysky. "Mantid-Data analysis and visualization package for neutron scattering and μSR experiments". In: *NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT* 764 (2014), 156–166. DOI: 10.1016/j.nima.2014.07.029.

[25] K. W. Plumb, A. T. Savici, G. E. Granroth, F. C. Chou, and Y.-J. Kim. "High-energy continuum of magnetic excitations in the two-dimensional quantum antiferromagnet $Sr_2CuO_2Cl_2$". In: *PHYSICAL REVIEW B* 89 (2014). DOI: 10.1103/PhysRevB.89.180410.

[26] H. J. Silverstein, K. Fritsch, F. Flicker, A. M. Hallas, J. S. Gardner, Y. Qiu, G. Ehlers, A. T. Savici, Z. Yamani, K. A. Ross, B. D. Gaulin, M. J. P. Gingras, J. A. M. Paddison, K. Foyevtsova, R. Valenti, F. Hawthorne, C. R. Wiebe, and H. D. Zhou. "Liquidlike correlations in single-crystalline $Y_2Mo_2O_7$: An unconventional spin glass". In: *PHYSICAL REVIEW B* 89 (2014). DOI: 10.1103/PhysRevB.89.054433.

[27] J. M. Borreguero, S. I. Campbell, O. A. Delaire, M. Doucet, M. Goswami, M. E. Hagen, V. E. Lynch, T. E. Proffen, S. Ren, A. T. Savici, and B. G. Sumpter. "Integrating Advanced Materials Simulation Techniques into an Automated Data Analysis Workflow at the Spallation Neutron Source". In: *TMS 2014 SUPPLEMENTAL PROCEEDINGS*. 2014, 297–308. DOI: 10.1002/9781118889879.ch39.

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[31] J. P. Carlo, T. Goko, I. M. Gat-Malureanu, P. L. Russo, A. T. Savici, A. A. Aczel, G. J. MacDougall, J. A. Rodriguez, T. J. Williams, G. M. Luke, C. R. Wiebe, Y. Yoshida, S. Nakatsuji, Y. Maeno, T. Taniguchi, and Y. J. Uemura. "New magnetic phase diagram of $(Sr,Ca)_2RuO_4$". In: *NATURE MATERIALS* 11 (2012), 323–328. DOI: 10.1038/NMAT3236.

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[42] T. Goko, A. A. Aczel, E. Baggio-Saitovitch, S. L. Bud'ko, P. C. Canfield, J. P. Carlo, G. F. Chen, P. Dai, A. C. Hamann, W. Z. Hu, H. Kageyama, G. M. Luke, J. L. Luo, B. Nachumi, N. Ni, D. Reznik, D. R. Sanchez-Candela, A. T. Savici, K. J. Sikes, N. L. Wang, C. R. Wiebe, T. J. Williams, T. Yamamoto, W. Yu, and Y. J. Uemura. "Superconducting state coexisting with a phase-separated static magnetic order in (Ba,K)Fe_2As_2, (Sr,Na)Fe_2As_2, and $CaFe_2As_2$". In: *PHYSICAL REVIEW B* 80 (2009). DOI: 10.1103/PhysRevB.80.024508.

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